

Claims

[c1]

Sub A2 → A piping support wedge apparatus for a jet pump in a nuclear reactor, said wedge apparatus comprising:

a first tapered wedge segment comprising a first end portion and a second end portion;

a second tapered wedge segment comprising a first end portion and a second end portion, said first and second wedge segments joined at said first end portions to form a substantially U-shaped body; and

a slot defined by an area between said first and second wedge segments and extending from said first end portions to said joined second end portions of said wedge segments.

[c2]

A wedge apparatus in accordance with Claim 1 further comprising a lug extending from said joined second end portions of said wedge segments, said lug comprising a bore extending therethrough.

[c3]

A wedge apparatus in accordance with Claim 1 further comprising a notch in said first end portions of said first and said second wedge segments.

[c4]

A wedge apparatus in accordance with Claim 1 wherein a longitudinal axis of said first wedge segment and a longitudinal axis of said second wedge segment are substantially parallel.

[c5]

A wedge apparatus in accordance with Claim 1 wherein said first and second tapered wedge segments are rotated with respect to each other along a longitudinal axis of said apparatus.

[c6]

Sub A3 → A nuclear reactor jet pump assembly comprising:

an inlet mixer;

a diffuser coupled to said inlet mixer by a slip joint;

a restrainer bracket comprising at least one set screw engagable with said inlet mixer; and

a piping support wedge apparatus positioned between said restrainer bracket and said inlet mixer, said wedge apparatus comprising:

a first tapered wedge segment comprising a first end portion and a second end

portion;

a second tapered wedge segment comprising a first end portion and a second end portion, said first and second wedge segments joined at said first end portions to form a substantially U-shaped body; and
 a slot defined by an area between said first and second wedge segments and extending from said first end portions to said joined second end portions of said wedge segments.

[c7] A jet pump assembly in accordance with Claim 6 wherein said wedge apparatus further comprises a lug extending from said joined second end portions of said wedge segments, said lug comprising a bore extending therethrough.

[c8] A jet pump assembly in accordance with Claim 6 wherein said wedge apparatus further comprises a notch in said first end portions of said first and said second wedge segments.

[c9] A jet pump assembly in accordance with Claim 6 wherein a longitudinal axis of said first wedge segment and a longitudinal axis of said second wedge segment are substantially parallel.

[c10] A jet pump assembly in accordance with Claim 6 wherein said first and second tapered wedge segments are rotated with respect to each other along a longitudinal axis of said apparatus.

[c11] A jet pump assembly in accordance with Claim 6 wherein said slot is sized to receive a restrainer bracket set screw.

Sub C11 [c12] 12. A jet pump assembly in accordance with Claim 11 wherein said first and second wedge segments are deformable around said set screw.

[c13] A method of restoring a tight rigid fit between an inlet mixer and an adjacent restrainer bracket in a nuclear reactor pressure vessel, the restrainer bracket coupled to a jet pump riser pipe and comprising at least one set screw, said method comprising:
 inserting a piping support wedge apparatus between the restrainer bracket and the inlet mixer; and

compressing the wedge apparatus around the restrainer bracket set screw, the wedge apparatus comprising:

a first tapered wedge segment comprising a first end portion and a second end portion;

a second tapered wedge segment comprising a first end portion and a second end portion, the first and second wedge segments joined at the first ends portions to form a substantially U-shaped body; and

a slot defined by an area between the first and second wedge segments and extending from the first end portions to the joined second end portions of the wedge segments.

- [c14] A method in accordance with Claim 13 wherein the wedge apparatus further comprises a lug extending from the joined second end portions of the wedge segments, the lug comprising a bore extending therethrough, and inserting a piping support wedge apparatus between the restrainer bracket and the inlet mixer comprises:
- coupling a handling pole to the lug bore; and
- lowering the wedge apparatus in place between the restrainer bracket and the inlet mixer.
- [c15] A method in accordance with Claim 13 wherein a longitudinal axis of the first wedge segment and a longitudinal axis of the second wedge segment are substantially parallel.
- [c16] A method in accordance with Claim 13 wherein the first and second tapered wedge segments are rotated with respect to each other along a longitudinal axis of the wedge apparatus.
- [c17] A method in accordance with Claim 13 wherein the wedge apparatus further comprises a notch in the first end portions of the first and second wedge segments.
- [c18] A method in accordance with Claim 17 wherein the slot is sized to receive a restrainer bracket set screw, and inserting a piping support wedge apparatus comprises positioning the wedge apparatus between the restrainer bracket and

the inlet mixer with an restrainer bracket set screw positioned inside the slot..

- [c19] A method in accordance with Claim 18 wherein the first and second wedge segments are deformable around the set screw, and compressing the wedge apparatus comprises:
- engaging the notches with an installation tool; and
 - deforming the the first and second wedge segments around the restrainer bracket set screw.